# Assignment-7

**Problem Statement:-**
Implement Knapsack problem using Greedy approach.

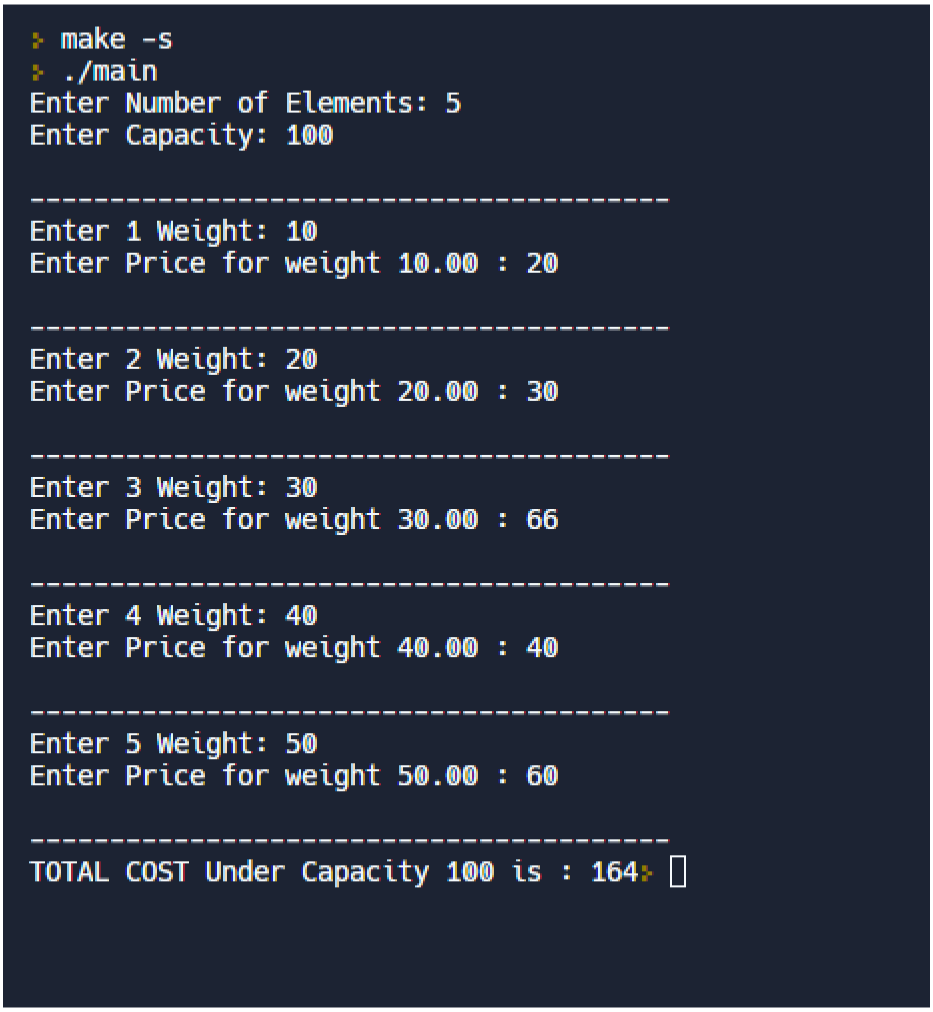
**Course Objective:-** To know the basics of computational complexity analysis and various algorithm design strategies.

**Course Outcomes:-** Students will be able to
1. Build the various algorithmic design paradigms.
2. Apply appropriate algorithmic strategy in problem-solving.
3. Analyze space and running times of the algorithms.

**Program:-**

```
#include <stdio.h>
#define MAX 100


int max(int n,float cp[]){
  float max=0,index=0;
  for(int i=0;i<n;i++){
    if(max<cp[i]){
      max=cp[i];
      index = i;
    }
  }
  return index;
}


void calculate(int n,float w[],float p[],int m){
  float cp[MAX]={};
  int index,Total_cost=0,capacity=m;
  float scale;
  for(int i=0;i<n;i++){
    cp[i]=p[i]/w[i];
  }
  for(int i=0;i<n;i++){
    index=max(n,cp);
    if(m>=w[index]){
      Total_cost +=p[index];
      m -= w[index];
    }
    else{
      scale=m/w[index];
      Total_cost +=(scale*p[index]);
      m -= (scale*w[index]);
    }
   cp[index]=0;
  }
  printf("TOTAL COST Under Capacity %d is : %d",capacity,Total_cost);
}
int main(void) {
  int n,m;
  float w[MAX]={},p[MAX]={};
  printf("Enter Number of Elements: ");
  scanf("%d",&n);
  printf("Enter Capacity: ");
  scanf("%d",&m);
  printf("\n----------------------------------------\n");
  for(int i=0;i<n;i++){
    printf("Enter %d Weight: ",i+1);
    scanf("%f",&w[i]);


    printf("Enter Price for weight %.2f : ",w[i]);
    scanf("%f",&p[i]);
    printf("\n----------------------------------------\n");
  }


  calculate(n,w,p,m);
  return 0;
}
```

**Output:-**



```
› make -s
› ./main
Enter Number of Elements: 5
Enter Capacity: 100

----------------------------------------
Enter 1 Weight: 10
Enter Price for weight 10.00 : 20

----------------------------------------
Enter 2 Weight: 20
Enter Price for weight 20.00 : 30

----------------------------------------
Enter 3 Weight: 30
Enter Price for weight 30.00 : 66

----------------------------------------
Enter 4 Weight: 40
Enter Price for weight 40.00 : 40

----------------------------------------
Enter 5 Weight: 50
Enter Price for weight 50.00 : 60

----------------------------------------
TOTAL COST Under Capacity 100 is : 164› ▯
```